



# Vascular Plants at John Muir National Historic Site

**The Question:** *What vascular plant species (including rare and invasive) are present at the John Muir National Historic Site?*

One of the main components of the San Francisco Bay Area Network's Inventory and Monitoring Program is to document the presence of vascular plants within the network and track their long-term changes. Effective land management depends on knowing what plant species are present and knowing their status over time. If populations of a species are changing (e.g. rare species is declining or invasive species in spreading), habitat management efforts may need to be implemented in order to protect and steward the natural resources of Mt. Wanda and the greater watershed.

It is interesting to note that despite John Muir's botanical skills and hikes around the area, he did not include any species from Mt. Wanda in his herbarium collection. A preliminary survey of plants at John Muir National Historic Site (JOMU) was conducted in 1992 through the National Park Service Pacific West Regional office.

**The Project:** *Inventory the vascular plants of all East Bay National Park Service units. Identify and collect voucher specimens for the flora of Mt. Wanda.*

In 2002-2003, the San Francisco Bay Area Network Inventory and Monitoring Program conducted an additional plant inventory of species at all three components of JOMU (house, graveyard and Mt. Wanda) as well as Port Chicago National Memorial (POCH) and Eugene O'Neill National Historic Site (EUON). The 2002 surveys were conducted by PRBO Conservation Science. The 2003 herbarium voucher collections were conducted by National Park Service staff on Mt. Wanda only.



Sample herbarium specimen at John Muir National Historic Site.



The herbarium preserves plant specimens for use by staff, volunteers, and interpreters.

**Survey Method for plant inventory:** Surveys were made throughout the growing season (February to September) of 2002. Areas were systematically surveyed each week for new species. During the 2003 season, two or more specimens were collected using a similar method. For most species, one specimen was collected and prepared for the park herbarium and a second specimen was collected and prepared for the Jepson and University Herbaria at the University of California Berkeley for identification and long term storage. New species were found during the second year of the study showing the benefit of conducting these projects over more than one season. All of the specimens were dried, mounted on herbarium paper, labeled and accessioned into the National Park Service museum management system. Specimens at the park are for use by staff, volunteers and interpretation purposes.



Butterfly mariposa lily (*Calochorus venustus*) was documented in the vascular plant inventory and is considered locally rare by the East Bay Chapter of the California Native Plant Society.

The Results: *A total of 298 native and non-native vascular plant species have been documented for Mt. Wanda.*

Of the vascular plant species occurring on Mt. Wanda, 481 specimens representing 234 species (78% of the species present) were collected and accessioned into the JOMU museum. At least 15 species not encountered during the 2002 survey were located and collected on Mt. Wanda during the herbarium project. If one specimen, instead of the standard two, was collected for a species it was sent to the Jepson and University Herbaria for long term storage and taxonomy. Specimens at the Jepson and University Herbaria can be tracked through an on-line database (see “Additional Resources” below).

Several species on Mt. Wanda are of management concern for their rarity or their non-native invasive status. Two rare species found on Mt. Wanda, Diablo sunflower (*Helianthella castanea*) and California black walnut (*Juglans californica* ssp. *hindsii*), are listed as species of special concern by the US Fish and Wildlife Service. The following 12 species occur on Mt. Wanda and are considered locally rare by the East Bay Chapter of the California Native Plant Society (Lake 2001): Heart-leafed milkweed (*Asclepias cordifolia*), Butterfly mariposa lily (*Calochortus venustus*), Cream sacs (*Castilleja rubicundula* ssp. *lithospermoides*), Chaparral clarkia (*Clarkia affinis*), Blue-eyed mary (*Collinsia sparsiflora* var. *sparsiflora*), Blue toadflax (*Linaria canadensis*), Big-leaf mistletoe (*Phoradendron macrophyllum*), Seablush (*Plectritis congesta*), Hop tree (*Ptelea crenulata*), Hillside gooseberry (*Ribes californicum* var. *californicum*), California tea (*Rupertia physodes*), and Skullcap (*Scutellaria tuberosa*). Refer to the PRBO Conservation Science report for rare species inventoried outside of Mt. Wanda.

Thirty-seven plant species on Mt. Wanda are categorized as wildland pest plants by the California Invasive Plant Council. Of these species, 17 have been mapped using Geographic Information Systems (computer-based mapping software) and some have been removed or targeted for removal since 2002. Other species on and off Mt. Wanda are listed as agricultural weeds by the California Department of Food and Agriculture.

Many of the species at the John Muir House are agricultural and ornamental species. A high percentage of the flora at all of the small units (EUON, POCH, JOMU gravesite, JOMU house) are non-native or invasive species. The species at POCH are unique to the others in that it is a salt marsh with a specifically adapted flora.

## Acknowledgements

We thank PRBO Conservation Science and the Jepson and University Herbaria staff for their involvement in the vascular plant inventory.

## Additional Resources

San Francisco Bay Area Inventory and Monitoring Program: <http://www1.nature.nps.gov/im/units/sfan/index.htm>

PRBO Conservation Science: <http://www.prbo.org>

California Invasive Plant Council: <http://www.cal-ipc.org>

Jepson and University Herbaria: <http://ucjeps.berkeley.edu/interchange.html>

## For More Information

Marcus Koenen, Inventory and Monitoring Coordinator, National Park Service, San Francisco Bay Area Network, Fort Cronkhite Bldg. 1063, Sausalito, CA 94965. [Marcus\\_Koenen@nps.gov](mailto:Marcus_Koenen@nps.gov).